TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Spring 2006 (Q2)
Installation Restoration Program Site 2
Vandenberg Air Force Base, California

16 August 2006

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1.0 INTRODUCTION

This report documents the activities and results of the spring 2006 groundwater monitoring at Installation Restoration Program Site 2 (Old Base Service Station, or OBSS), Operable Unit 6, Vandenberg Air Force Base (AFB), Santa Barbara County, California. Samples were collected at Site 2 by Tetra Tech, Inc. (Tetra Tech) during May 2006. The location of Site 2 is shown on Figure 1.

The groundwater monitoring is being completed in accordance with the Basewide Groundwater Monitoring Program (BGMP) Work Plan (Tetra Tech 2000a), the BGMP Health and Safety Plan Addendum (Tetra Tech 2000b), the Basewide Sampling and Analysis Plan (Tetra Tech 2003), the BGMP Quality Assurance Project Plan (QAPP) Addendum (Tetra Tech 2004a), the Vandenberg AFB Hazardous Waste Management Plan (Vandenberg AFB 2002), and the Waste Management Plan Addendum (Tetra Tech 2005). Regulatory oversight of the work is being performed by the California Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board—Central Coast Region (RWQCB).

Site background information is summarized in Section 2.0. The scope of work and methodology for groundwater monitoring are presented in Section 3.0. The results of the quarterly monitoring are presented in Section 4.0. Quality Assurance/Quality Control is discussed in Section 5.0. Recommendations for future sampling are presented in Section 6.0.

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND HISTORY

Installation Restoration Program Site 2 is located in the main cantonment area, north of the intersection of Wyoming and Summersil Avenues. In early 2000, a Tee-Ball field was constructed over most of the Site (Figure 1). The Child Development Center playground is located to the northeast.

The OBSS had a service station building and three pump islands on a 200-foot by 200-foot asphalt lot. The site had four 10,000-gallon gasoline underground storage tanks (USTs), a 500-gallon aboveground waste oil tank, and an oil/water separator (OWS). The OBSS dispensed leaded and unleaded gasoline from 1941 until 1981.

All structures, tanks, and piping associated with the OBSS were removed between 1981 and 1998 (HydroGeoLogic [HGL] 2001). All four gasoline USTs, which were located at the northwest corner of the site, were removed in 1981. In 1992, Jacobs Engineering Group, Inc. (JEG) removed the concrete OWS and fuel distribution piping (HGL 2001). In 1998, the 500-gallon waste oil tank was removed. During the removal of the OBSS building, the pump islands, and the pavement in 1998, monitoring wells 2-MW-2, and OS-MW-4 were reportedly destroyed and wells OS-MW-3A and OS-MW-2 were damaged (HGL 2001).

In 1999, IT Corporation, Inc. (IT) began investigations at the site. In September 1999, IT conducted a shallow soil investigation. HGL continued the investigation and, in November 1999, removed 170 cubic yards of soil below the former location of the two easternmost pump islands (along the southern portion of the site) (HGL 2001). The Tee-Ball field was built several months after completion of the excavation activities (Martinez 2001).

During the construction of the Tee-Ball field and the realignment of Wyoming Avenue and Utah Avenue, monitoring wells 2-MW-5 through 2-MW-9, OS-MW-3A, and OS-MW-4 were buried under fill material. Wells 2-MW-5 through 2-MW-9 were subsequently found and are not damaged. In September 2000,

Tetra Tech was requested to determine the condition of wells OS-MW-2, OS-MW-3A, and OS-MW-4. Well OS-MW-2 was found undamaged. Tetra Tech was unable to find monitoring wells OS-MW-3A and OS-MW-4 due to the amount of fill material covering them. The condition of these wells is unknown; however, it appears likely they have been destroyed. In a letter dated 6 February 2001 the Air Force recommended no further search for these wells. The RWQCB concurred with this recommendation in a letter dated 15 March 2001.

In February 2002, Tetra Tech installed a remote sampling system for wells 2-MW-5, 2-MW-7, 2-MW-8, and 2-MW-9 at Site 2. The system was designed to facilitate quarterly sampling of these wells, which are buried under the Tee-Ball field, without delaying use of the Tee-Ball field or impacting the condition of the grass on the field or surrounding grounds.

The remote sampling system was installed with watertight well caps and continuous tubing. The static water levels of these wells are measured using a pressure transducer that calculates the height of a water column above an open-ended tube suspended in the casing. The pressure transducer is zeroed to ambient pressure before the first reading is taken. Since the wells are sealed to prevent surface water intrusion, the air inside the casings is no longer at ambient pressure. For this reason the static water levels measured by the remote sampling system may be different from what is measured by the pressure transducer.

2.2 HYDROGEOLOGY

Site 2 is located on Burton Mesa, where groundwater typically occurs unpredictably in small lenses perched on low-permeability layers. At Site 2, groundwater is encountered in apparently discontinuous perched lenses in the unconsolidated sediments overlying Monterey Formation bedrock and, more importantly, in fractured cherts and porcelanites (HGL 2001). Groundwater occurring in this fractured zone within the Monterey Formation represents the groundwater monitoring network sampled under the BGMP at Site 2.

Groundwater depths range from 14 to 31 feet below ground surface (bgs). However, groundwater was encountered during drilling at approximately 10 feet below the static level measured in the monitoring wells (HGL 2001).

Groundwater levels measured in May 2006 indicate the groundwater elevation ranged from approximately 451 to 454 feet above mean sea level (msl) (Table 1). Based on data from this quarter, the interpreted direction of groundwater flow at Site 2 was to the northwest with an average hydraulic gradient of 0.01 feet per foot (Figure 1).

Monitoring wells at Site 2 are screened between 411.3 and 452.5 feet above msl (Tetra Tech 2004b). According to the Supplemental Remedial Investigation Report completed by HGL, the deep groundwater zone occurs below lenses of relatively impermeable material. The boring logs of monitoring wells sampled as part of the BGMP show groundwater was encountered at depths below laminated mudstone, silty clay, or clay layers (HGL 2001). Therefore, the groundwater sampled as part of the BGMP is from the deep groundwater zone.

3.0 SCOPE OF WORK

The work performed during spring 2006 at Site 2 included measuring groundwater elevations, collecting groundwater samples for laboratory analysis, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Two wells were sampled at Site 2 during spring 2006. Dedicated MicroPurge pumps were used for purging and sampling groundwater from wells 2-MW-8 and 2-MW-12. The pumping rates were calibrated for each well prior to purging to maintain a static water level (i.e., minimal drawdown). Due to high turbidity, well 2-MW-12 was sampled after purging five pump and tubing volumes of water. Sampling was conducted in accordance with the documents cited in Section 1.0. Measured groundwater elevations are presented in Table 1, and groundwater contours are illustrated on Figure 1. Purge records are provided in Appendix A.

In general, wells were purged until a minimum of one pump and tubing volume of water was removed and water quality parameters had stabilized. Criteria for determining stabilization are three successive measurements of temperature within ±1 degree Celsius, pH within ±0.1, conductivity within ±5 percent, and a turbidity reading of less than 5 nephelometric turbidity units (NTUs). In cases where stability or a turbidity reading of less than 5 NTUs was not obtained, samples were collected after purging a minimum of five pump and tubing volumes of water.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured during purging and sampling. Field parameter readings measured immediately prior to sampling are presented in Table 2. Fixed laboratory analyses were performed by EMAX Laboratories, Inc. in Torrance, California. Samples were analyzed according to the work plan (Tetra Tech 2000a) for dissolved metals by U.S. Environmental Protection Agency (EPA) method SW6010B, volatile organic compounds (VOCs) by EPA method SW8260B, semivolatile organic compounds (SVOCs) by EPA method SW8270C, and polynuclear aromatic hydrocarbons (PAHs) by EPA method SW8270C with selected ion monitoring (SIM). Laboratory analyses and data validation were conducted according to the QAPP Addendum (Tetra Tech 2004a). Data validation was performed on 100 percent of the analytical data. Analytical results are presented in Tables 3 through 5 and on Figure 2. A historical summary of key contaminants of concern (COCs) is presented in Table 6 and on Figures 3A and 3B. Figure 3A contains historical data for key COCs from December 1999 through fall 2003, and Figure 3B contains historical data for key COCs from winter 2004 to present. Hydrographs showing historical benzene and naphthalene concentrations in groundwater from well 2-MW-8 are presented on Figure 4. Chain-of-custody records are provided in Appendix B.

4.1 METALS

The groundwater sample collected from well 2-MW-12 was analyzed for dissolved metals. Dissolved metal concentrations were compared to the 95th percentile background threshold values (BTVs) for groundwater (JEG 1994) and primary maximum contaminant levels (MCLs).

Arsenic was detected above the BTV of 7 µg/L and the MCL of 10 micrograms per liter (µg/L) at a concentration of 10.1 µg/L.

Thallium was detected above the BTV of 1 µg/L and the primary MCL of 2 µg/L at a concentration of 9.55 µg/L. Thallium concentrations in groundwater from well 2-MW-12 have been increasing since spring 2005 (Table 6 and Figures 3A and 3B).

In addition, barium, calcium, cobalt, magnesium, molybdenum, and sodium were detected at concentrations above their respective BTVs.

4.2 VOLATILE ORGANIC COMPOUNDS

The groundwater sample collected from well 2-MW-8 was analyzed for VOCs. Benzene was detected above the primary MCL of 1 µg/L in groundwater at a concentration of 68 µg/L (Table 4).

Concentrations of benzene in groundwater from well 2-MW-8 have generally been increasing and have been above the MCL of 1 µg/L since December 1999 (Figure 4). All key VOC concentrations in groundwater from well 2-MW-8 increased between fall 2005 and winter 2006. There is no apparent correlation between benzene concentrations and groundwater elevations in well 2-MW-8.

4.3 SEMIVOLATILE ORGANIC COMPOUNDS AND POLYNUCLEAR AROMATIC HYDROCARBONS

Groundwater samples collected from well 2-MW-8 were analyzed for SVOCs and PAHs. Naphthalene was detected in groundwater from well 2-MW-8 at a historic high of 29 µg/L using EPA method SW8270C for SVOCs and at a concentration of 24 µg/L using EPA method SW8270C with SIM for PAHs (Table 5). The compound 2-methylnaphthalene was detected in groundwater from the same well at a concentration of 32 µg/L using EPA method SW8270C.

Naphthalene has been detected at concentrations above the California Department of Health Services notification level of 17 µg/L during nine sampling events since December 1999 and have been generally increasing (Figure 4).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

All of the analytical data presented in this report have been validated according to the QAPP Addendum (Tetra Tech 2004a). The data validation process includes review of sample preservation, temperature, and hold times; detection and quantitation limits; instrument calibration; and equipment blank, trip blank, method blank, laboratory control sample, and matrix spike/matrix spike duplicate. Data validation qualifiers and comments are provided on the data tables to indicate the results of the data validation and to quantitatively indicate the usability of the data. In addition, field sampling records are reviewed to assess the potential for any field conditions to adversely impact the data quality.

There were no significant quality assurance/quality control discrepancies with the data presented in this report. The data quality objectives for the spring 2006 sampling at Site 2 were achieved.

6.0 RECOMMENDATIONS

In the winter 2006 Groundwater Monitoring Report for Site 2, Tetra Tech and the Air Force made the following recommendations:

1. Remove SVOC analysis for wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7, OS-MW-1, and OS-MW-2. The RWQCB and DTSC concurred with this recommendation.

2. Reduce SVOC analysis for well 2-MW-8, from quarterly to semiannually during winter and summer quarters. The RWQCB and DTSC concurred with this recommendation.

3. Remove PAH analysis for wells 2-MW-8 and OS-MW-2. The RWQCB and DTSC concurred with this recommendation.

4. Remove TPHg analysis for wells OS-MW-1 and OS-MW-2. The RWQCB and DTSC concurred with this recommendation.

The summer 2006 sampling will be conducted according to the work plan (Tetra Tech 2000a).

7.0 REFERENCES

HydroGeoLogic, Inc. (HGL)

2001 *Supplemental Remedial Investigation Report, Site 2 – Old Base Service Station, Vandenberg AFB, California. Final.* Prepared for the Air Force Center for Environmental Excellence. December.

Jacobs Engineering Group, Inc. (JEG)

1994 *Basewide Background Sampling Report. Final.* Prepared for the Air Force Center for Environmental Excellence. June.

Martinez, Pablo

2001 30 CES/CEVR Installation Restoration Program Geologist, personal communication, Vandenberg Air Force Base, California.

Tetra Tech, Inc. (Tetra Tech)

2000a *Basewide Groundwater Monitoring Program Work Plan.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. December.

Tetra Tech, Inc. (Tetra Tech)

2000b *Basewide Groundwater Monitoring Program Health and Safety Plan Addendum.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. December.

Tetra Tech, Inc. (Tetra Tech)

2003 *Final Basewide Sampling and Analysis Plan.* Prepared for 30 CES/CEV Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. September.

Tetra Tech, Inc. (Tetra Tech)

2004a *Basewide Groundwater Monitoring Program Quality Assurance Project Plan Addendum. Final.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California, and Department of the Air Force, Air Force Center for Environmental Excellence, DERA Restoration Division, 3300 Sidney Brooks, Brooks City-Base, Texas. July.

Tetra Tech, Inc. (Tetra Tech)

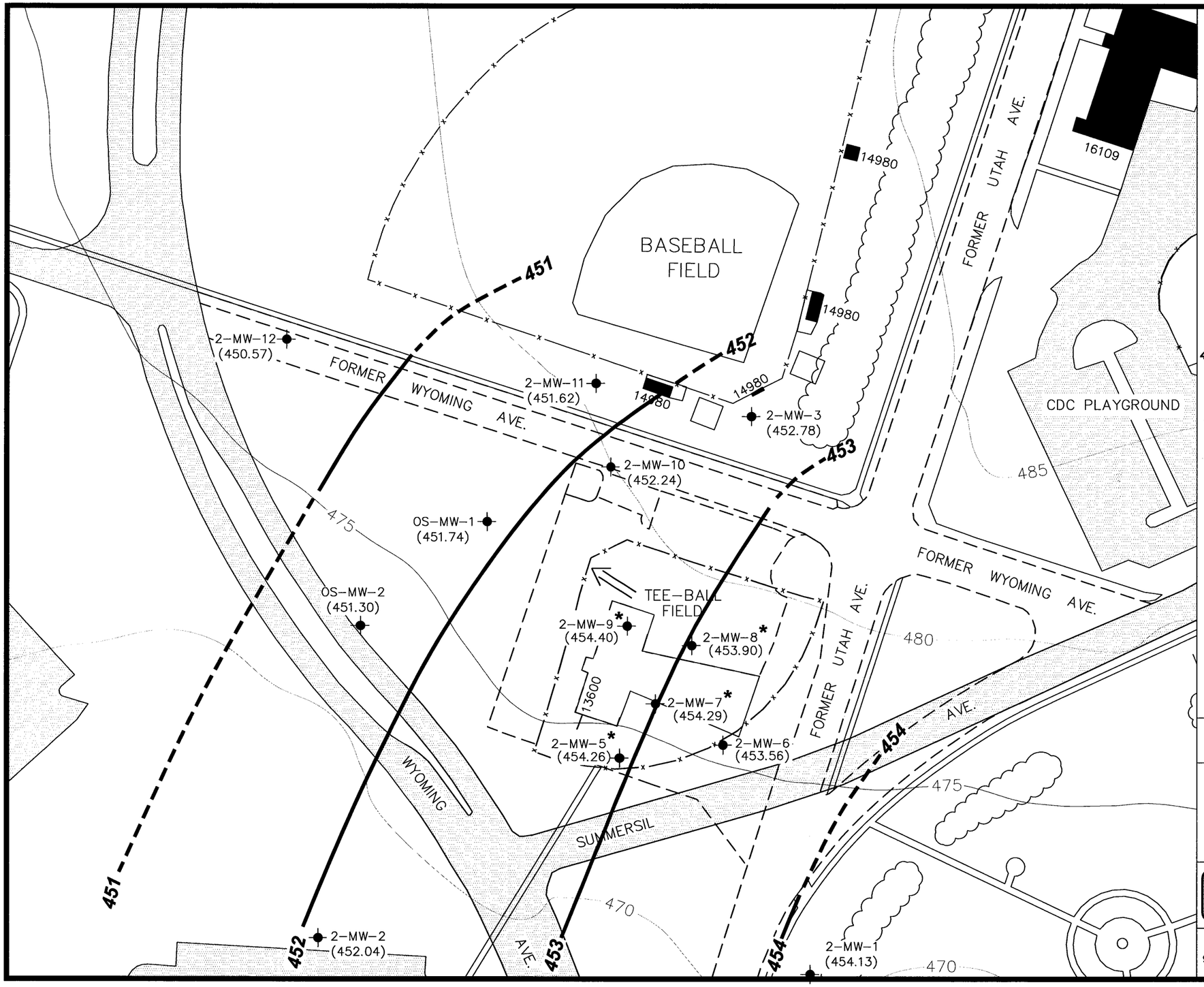
2004b *Basewide Groundwater Monitoring Program Report, Summer 2004, Installation Restoration Program Site 2, Vandenberg Air Force Base, California.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California, and Department of the Air Force, Headquarters Air Force Center for Environmental Excellence/ICS, 3300 Sidney Brooks, Brooks City-Base, Texas. December.

Tetra Tech, Inc. (Tetra Tech)

2005 *Waste Management Plan Addendum. Final.* 730 CES/CEVR, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. February.

Vandenberg Air Force Base (Vandenberg AFB)

2002 Headquarters Thirtieth Space Wing, Vandenberg AFB, California. *Hazardous Waste Management Plan, 30 SW Plan 32-7043-A, Change 1.* HQ 30th Space Wing, Vandenberg Air Force Base, California 93437-6261. April.



LEGEND

- CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- BUILDING
- DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-11 (451.62) GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION
- 452 — 452 GROUNDWATER ELEVATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION
- TEE-BALL FIELD FENCE
- * GROUNDWATER ELEVATION NOT USED IN ESTIMATION OF CONTOURS; NON-VENTED WELLS PART OF REMOTE SAMPLING SYSTEM.

NOTE(S): GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL AS MEASURED IN MAY 2006.

N

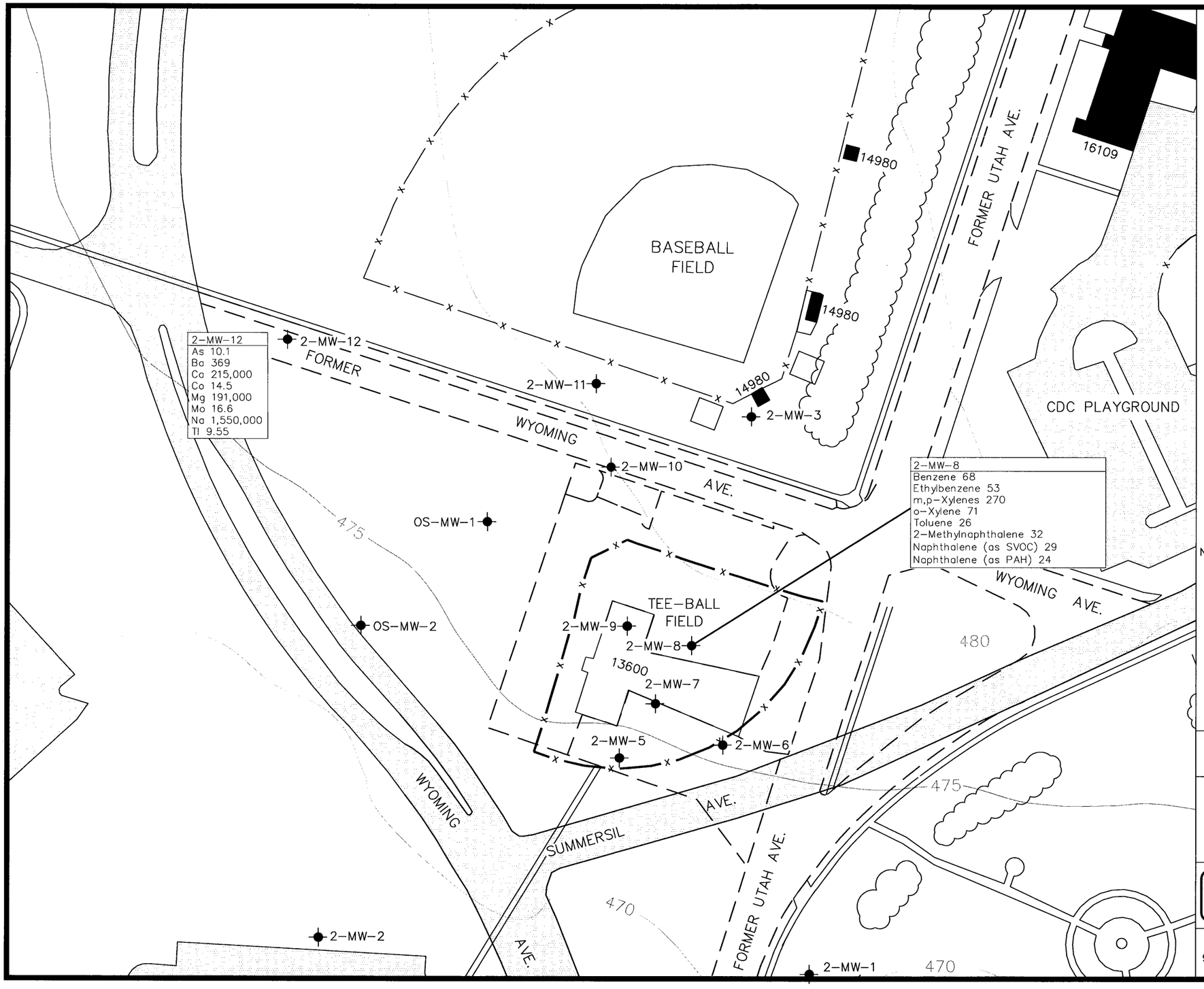
0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
SITE PLAN AND
GROUNDWATER CONTOURS
SPRING 2006

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99171-19	7/28/06	PRICHARD	TAB21	5697	1



LEGEND

- CONTOUR OF GROUND SURFACE ELEVATIONS IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- BUILDING
- DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- GROUNDWATER MONITORING WELL
- TEE-BALL FIELD FENCE

NOTE(S): RESULTS FOR ALL COMPOUNDS ARE IN µg/L.
METALS RESULTS ARE FOR FILTERED GROUNDWATER WITH CONCENTRATIONS ABOVE BTVs.

N

0 37.5' 75' 112.5'

SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
ANALYTICAL RESULTS
SPRING 2006

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99171-19	7/10/06	PRICHARD	TAB21	5720	2

2-MW-10	Benzene	Toluene	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.0472	ND	0.137	NA	NA	60.2	NA	NA
Fall-00	ND	ND	ND	ND	ND	80.4	23.5	ND
Win-01	ND	ND	ND	ND	ND	78.8	14.3	ND
Spr-01	ND	0.53	ND	ND	ND	76.3	20.9	ND
Sum-01	ND	ND	ND	232	ND	77.4	32.3	ND
Fall-01	ND	ND	ND	277	ND	88.1	27.4	71.1
Win-02*	ND	ND	ND	651	ND	71.8	22.6	ND
Sum-02	ND	ND	NA	341	ND	87.5	9.67	ND
Win-03	ND	ND	NA	622	ND	11.3	20.8	ND
Sum-03	ND	ND	NA	939	2.7	59.7	23.9	ND

2-MW-12	Cd	Al	Se	Se	Tl
Spr-01	36.3	ND	ND	ND	ND
Sum-01	36.1	ND	ND	ND	ND
Fall-01	31.6	ND	ND	66.1	69.7
Win-02*	ND	284	ND	ND	ND
Spr-02	12.7	186	ND	ND	ND
Sum-02	17.4	ND	ND	ND	ND
Fall-02	ND	ND	40.7	ND	ND
Win-03	8.12	ND	52.1	ND	ND
Spr-03	1.9	26.6	ND	ND	ND
Fall-03	ND	33.6	3.3	ND	ND

2-MW-11	Cd	Al	Se	Tl
Spr-01	5.87	ND	25.3	ND
Sum-01	5.39	ND	24.1	ND
Fall-01	7.18	ND	25.2	66.1
Win-02*	4.33	341	25.8	ND
Spr-02	5.11	242	55	ND
Sum-02	5.8	ND	23.7	ND
Fall-02	4.56	ND	87.5	ND
Win-03	5.74	ND	148	ND
Spr-03	5	33.2	36.3	ND
Fall-03	6.5	26.2	36.3	ND

2-MW-3	Benzene	Al	Cd	Se	Tl
Dec-99	0.0465	NA	2.32	NA	NA
Fall-00	ND	ND	12	ND	ND
Win-01	ND	ND	ND	ND	ND
Spr-01	ND	ND	4.13	ND	ND
Sum-01	ND	ND	6.6	ND	ND
Fall-01	ND	ND	2.05	ND	44.9
Win-02*	ND	ND	5.84	ND	ND
Spr-02	ND	118	7	ND	ND
Sum-02	ND	ND	5.98	ND	ND
Win-03	ND	ND	4.17	23.1	ND
Sum-03	ND	ND	ND	ND	ND

OS-MW-1	Al	Cd	Se	Tl
Dec-99	NA	38.1	NA	NA
Fall-00	ND	85.6	14.8	ND
Win-01	ND	54.7	9.11	ND
Spr-01	ND	54.5	16.3	ND
Sum-01	ND	50.8	15.8	ND
Fall-01	ND	60.5	13.6	65.2
Win-02*	313	46.6	ND	ND
Spr-02	NA	NA	NA	NA
Sum-02	ND	58.8	ND	ND
Fall-02	NA	NA	NA	NA
Win-03	ND	63.2	58.3	ND
Spr-03	NA	NA	NA	NA
Sum-03	42.8	64.7	18	ND
Fall-03	NA	NA	NA	NA

2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.0485	ND	0.205	NA	42.3	NA	NA
Fall-00	ND	ND	ND	ND	34	43.4	ND
Win-01	ND	ND	ND	ND	74.5	37.5	ND
Spr-01	ND	0.59	ND	268	76.5	40.3	ND
Sum-01	ND	ND	ND	ND	81.1	42.0	ND
Fall-01	ND	ND	ND	483	96	47.8	78.4
Win-02*	ND	ND	ND	548	72.1	31.1	ND
Sum-02	ND	ND	ND	ND	73.4	31.2	ND
Win-03	ND	ND	ND	265	12.4	88.6	ND
Sum-03	ND	ND	ND	284	85.8	56.7	ND

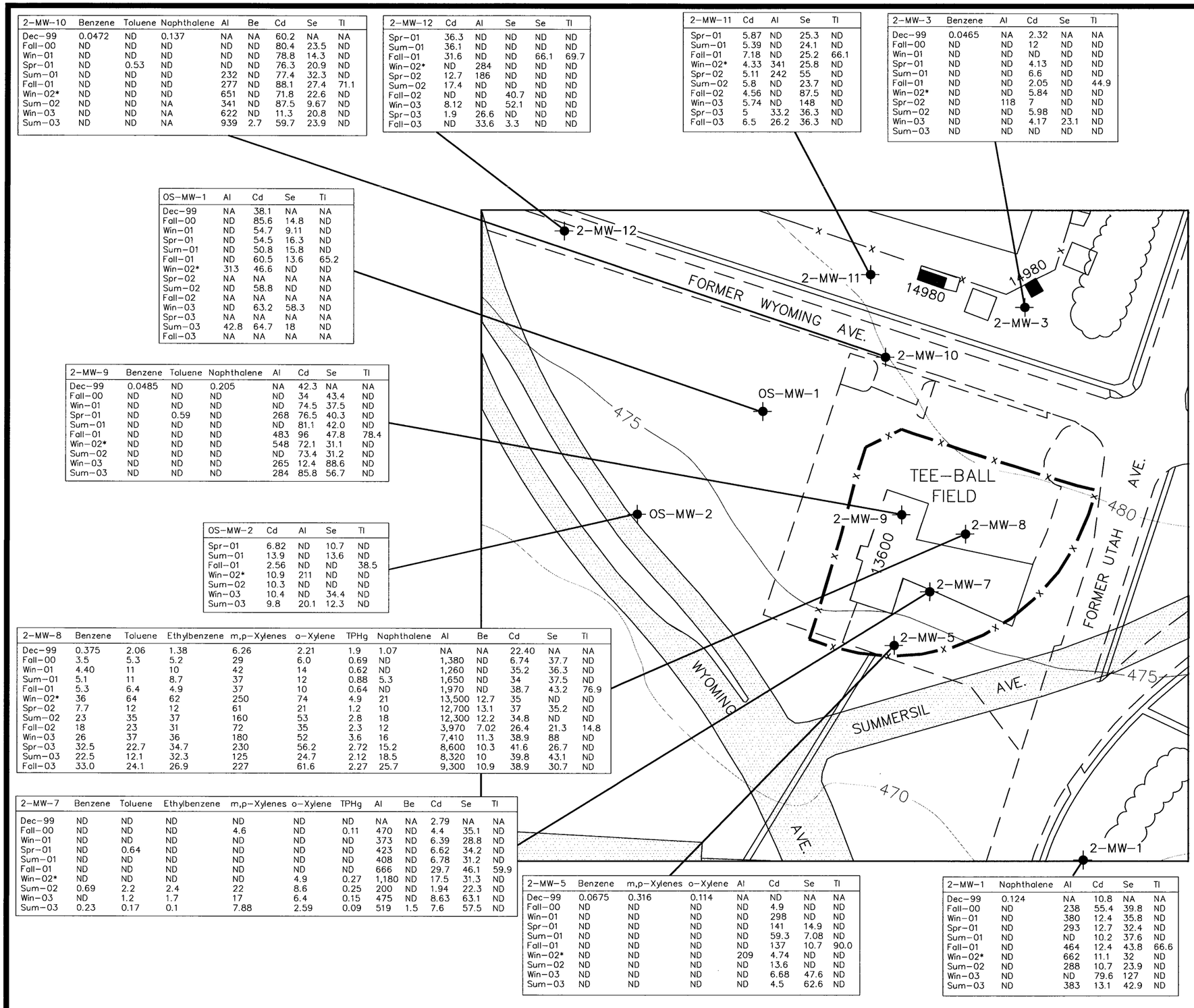
OS-MW-2	Cd	Al	Se	Tl
Spr-01	6.82	ND	10.7	ND
Sum-01	13.9	ND	13.6	ND
Fall-01	2.56	ND	ND	38.5
Win-02*	10.9	211	ND	ND
Sum-02	10.3	ND	ND	ND
Win-03	10.4	ND	34.4	ND
Sum-03	9.8	20.1	12.3	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.375	2.06	1.38	6.26	2.21	1.9	1.07	NA	NA	22.40	NA	NA
Fall-00	3.5	5.3	5.2	29	6.0	0.69	ND	1,380	ND	6.74	37.7	ND
Win-01	4.40	11	10	42	14	0.62	ND	1,260	ND	35.2	36.3	ND
Sum-01	5.1	11	8.7	37	12	0.88	5.3	1,650	ND	34	37.5	ND
Fall-01	5.3	6.4	4.9	37	10	0.64	ND	1,970	ND	38.7	43.2	76.9
Win-02*	36	64	62	250	74	4.9	21	13,500	12.7	35	ND	ND
Spr-02	7.7	12	12	61	21	1.2	10	12,700	13.1	37	35.2	ND
Sum-02	23	35	37	160	53	2.8	18	12,300	12.2	34.8	ND	ND
Fall-02	18	23	31	72	35	2.3	12	3,970	7.02	26.4	21.3	14.8
Win-03	26	37	36	180	52	3.6	16	7,410	11.3	38.9	88	ND
Spr-03	32.5	22.7	34.7	230	56.2	2.72	15.2	8,600	10.3	41.6	26.7	ND
Sum-03	22.5	12.1	32.3	125	24.7	2.12	18.5	8,320	10	39.8	43.1	ND
Fall-03	33.0	24.1	26.9	227	61.6	2.27	25.7	9,300	10.9	38.9	30.7	ND

2-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Al	Be	Cd	Se	Tl
Dec-99	ND	ND	ND	ND	ND	ND	NA	NA	2.79	NA	NA
Fall-00	ND	ND	ND	4.6	ND	0.11	470	ND	4.4	35.1	ND
Win-01	ND	ND	ND	ND	ND	ND	373	ND	6.39	28.8	ND
Spr-01	ND	0.64	ND	ND	ND	ND	423	ND	6.62	34.2	ND
Sum-01	ND	ND	ND	ND	ND	ND	408	ND	6.78	31.2	ND
Fall-01	ND	ND	ND	ND	ND	ND	666	ND	29.7	46.1	59.9
Win-02*	ND	ND	ND	ND	4.9	0.27	1,180	ND	17.5	31.3	ND
Sum-02	0.69	2.2	2.4	22	8.6	0.25	200	ND	1.94	22.3	ND
Win-03	ND	1.2	1.7	17	6.4	0.15	475	ND	8.63	63.1	ND
Sum-03	0.23	0.17	0.1	7.88	2.59	0.09	519	1.5	7.6	57.5	ND

2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Dec-99	0.0675	0.316	0.114	NA	ND	NA	NA
Fall-00	ND	ND	ND	ND	4.9	ND	ND
Win-01	ND	ND	ND	ND	298	ND	ND
Spr-01	ND	ND	ND	ND	141	14.9	ND
Sum-01	ND	ND	ND	ND	59.3	7.08	ND
Fall-01	ND	ND	ND	ND	137	10.7	90.0
Win-02*	ND	ND	ND	209	4.74	ND	ND
Sum-02	ND	ND	ND	ND	13.6	ND	ND
Win-03	ND	ND	ND	ND	6.68	47.6	ND
Sum-03	ND	ND	ND	ND	4.5	62.6	ND

2-MW-1	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.124	NA	10.8	NA	NA
Fall-00	ND	238	55.4	39.8	ND
Win-01	ND	380	12.4	35.8	ND
Spr-01	ND	293	12.7	32.4	ND
Sum-01	ND	ND	10.2	37.6	ND
Fall-01	ND	464	12.4	43.8	66.6
Win-02*	ND	662	11.1	32	ND
Sum-02	ND	288	10.7	23.9	ND
Win-03	ND	ND	79.6	127	ND
Sum-03	ND	383	13.1	42.9	ND



LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- —x— FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-1 — GROUNDWATER MONITORING WELL
- —x— TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- * — INSTALLED MICROPURGE PUMP
- TPHg — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- mg/L — MILLIGRAMS PER LITER

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Al–1,200µg/L
Cd–5µg/L
Be–0.3µg/L
Se–3µg/L
Tl–1µg/L

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
DECEMBER 1999 THROUGH FALL 2003

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99171-19	7/28/06	PRICHARD	TAB21	5738	3A

2-MW-10	Benzene	Toluene	Al	Be	Cd	Se	Tl
Win-04	ND	ND	505	1.7	69.9	21.1	ND
Sum-04	ND	ND	213	ND	64.5	24.1	ND
Win-05	NA	NA	521	1.5	71.3	28.8	6.44
Sum-05	NA	NA	ND	ND	ND	ND	7.44
Win-06	NA	NA	74.7	ND	28.8	7.46	ND

2-MW-11	Al	Cd	Se	Tl
Win-04	23	4.9	38.6	1.4
Sum-04	ND	4.59	42.8	6.17
Fall-04	ND	7.1	44.1	ND
Win-05	ND	8.21	45.7	8.56
Spr-05	ND	3.2	45.6	11.1
Sum-05	ND	7.74	46	6.03
Fall-05	ND	3.69	40.8	6.69
Win-06	ND	5	41.9	ND

2-MW-3	Benzene	Al	Cd	Se	Tl
Win-04	ND	17.8	ND	ND	ND
Sum-04	ND	ND	ND	ND	6.03
Win-05	NA	ND	ND	ND	ND
Sum-05	ND	ND	ND	ND	ND
Win-06	NA	ND	ND	ND	ND

2-MW-12	Al	Cd	Se	Tl
Win-04	19	ND	ND	1.80
Sum-04	ND	ND	ND	ND
Fall-04	ND	ND	ND	ND
Win-05	ND	ND	ND	ND
Spr-05	ND	ND	ND	5.5
Sum-05	ND	2.07	ND	5.99
Fall-05	ND	ND	ND	7.28
Win-06	ND	ND	ND	ND
Spr-06	ND	ND	ND	9.55

OS-MW-1	Al	Cd	Se	Tl
Win-04	44.6	73.8	17.1	0.85
Spr-04	NA	NA	NA	NA
Sum-04	ND	64.9	15.2	ND
Fall-04	NA	NA	NA	NA
Win-05	ND	72.3	13.3	ND
Sum-05	ND	64	13.5	ND
Win-06	ND	52.3	6.99	ND

2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	132	83.5	33.4	1.10
Sum-04	ND	ND	ND	ND	84.4	44.7	10.6
Win-05	NA	NA	ND	104	87.2	48.3	ND
Sum-05	ND	ND	ND	61.5	86.1	48.3	6.26
Win-06	ND	ND	ND	ND	84.8	46.8	ND

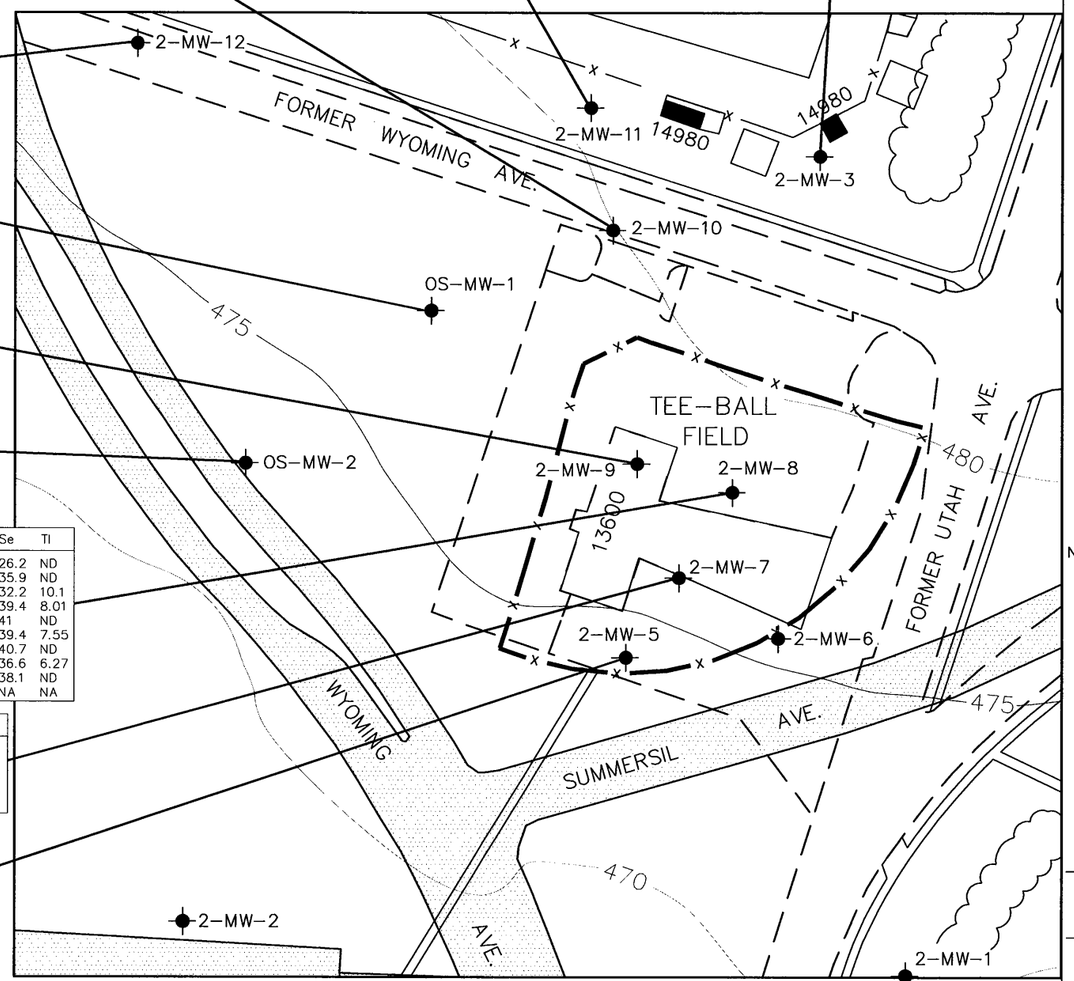
OS-MW-2	Al	Cd	Se	Tl
Win-04	26.9	5.2	8.3	1.30
Sum-04	ND	2.25	15.9	ND
Win-05	ND	2.52	6.56	ND
Sum-05	ND	3.84	7.79	ND
Win-06	ND	3.39	11.4	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Naphthalene	Al	Be	Cd	Se	Tl
Win-04	33.8	9.98	34.1	218	48.7	2.55	28.8	6,880	9.8	39.6	26.2	ND
Spr-04	22	6.7	20	110	28	1.5	9.7	5,330	8.42	40.5	35.9	ND
Sum-04	21	5.5	19	90	28	1.2	9.2	5,100	8.25	40.2	32.2	10.1
Fall-04	39	8.9	34	190	48	2.3	21	5,420	7.79	39.5	39.4	8.01
Win-05	57	11	39	240	51	NA	17	5,070	7.47	39.5	41	ND
Spr-05	36	8.7	26	160	42	NA	22	5,430	7.82	36.8	39.4	7.55
Sum-05	37	7.7	22	53	41	1.4	16	5,060	6.81	37.6	40.7	ND
Fall-05	35	7.5	30	160	40	NA	12	4,960	7.14	33.9	36.6	6.27
Win-06	67	21	56	290	71	2.8	23	5,750	7.68	35	38.1	ND
Spr-06	68	26	53	270	71	NA	29	NA	NA	NA	NA	NA

2-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Al	Be	Cd	Se	Tl
Win-04	0.32	ND	0.14	8.08	2.97	0.09ª	224	ND	6.8	27.2	ND
Sum-04	0.45	ND	0.29	11	4.3	0.1	574	2.43	10.3	37.3	9.7
Win-05	NA	NA	NA	NA	NA	NA	662	1.64	7.06	37	9.98
Sum-05	1.5	0.74	1.3	31	11	0.2	543	1.71	7.63	35.8	5.48
Win-06	1.7	0.8	2.2	30	11	0.29	652	1.62	7.93	33	ND

2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	21.9	3.4	16.9	ND
Sum-04	ND	ND	ND	ND	14.1	17.6	5.88
Win-05	NA	NA	NA	ND	4.96	25	ND
Sum-05	NA	NA	NA	ND	5.49	24.8	7.01
Win-06	NA	NA	ND	ND	3.74	21.2	ND

2-MW-1	Naphthalene	Al	Cd	Se	Tl
Win-04	D	464	14.1	35	1.30
Sum-04	ND	408	12	40.1	7.55
Win-05	ND	386	11	39.4	7.62
Sum-05	ND	445	14	45.7	9.77
Win-06	ND	413	11.8	41.7	ND



LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- x — FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-1 — GROUNDWATER MONITORING WELL
- x — TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- a — RESULT WAS QUALIFIED FOR BLANK CONTAMINATION (B-QUALIFIED) AND IS SUSPECTED TO BE A FALSE POSITIVE.
- TPHg — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- mg/L — MILLIGRAMS PER LITER

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Al-1,200µg/L
Be-0.3µg/L
Cd-5µg/L
Se-3µg/L
Tl-1µg/L

N

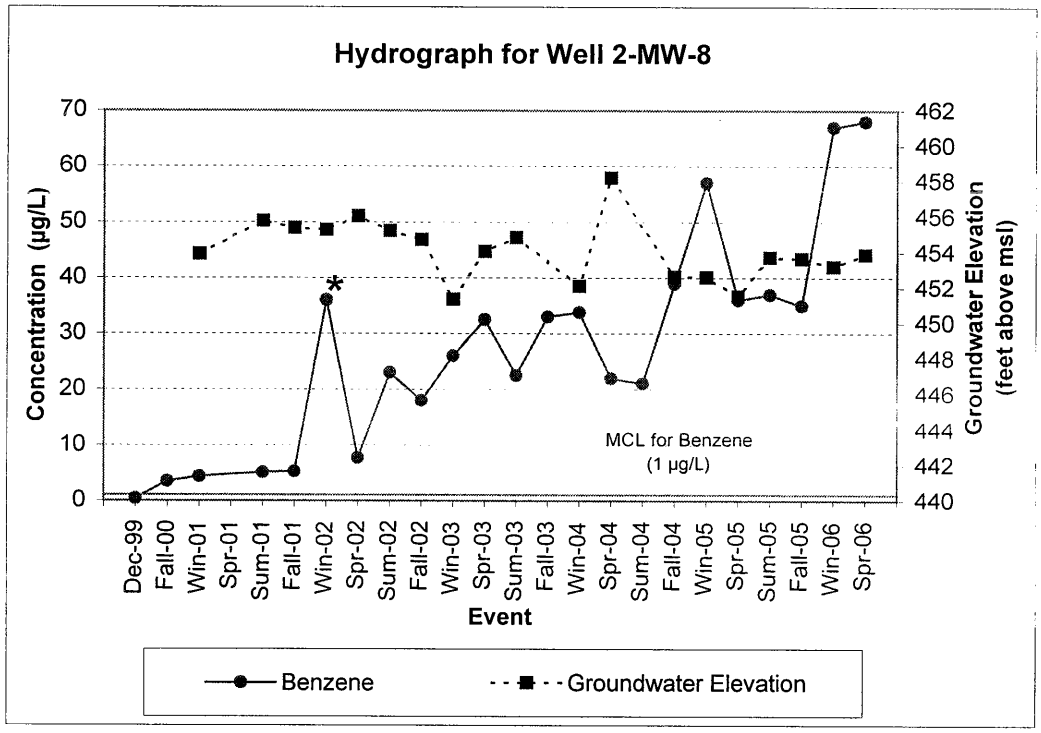
0 37.5' 75' 112.5'
SCALE

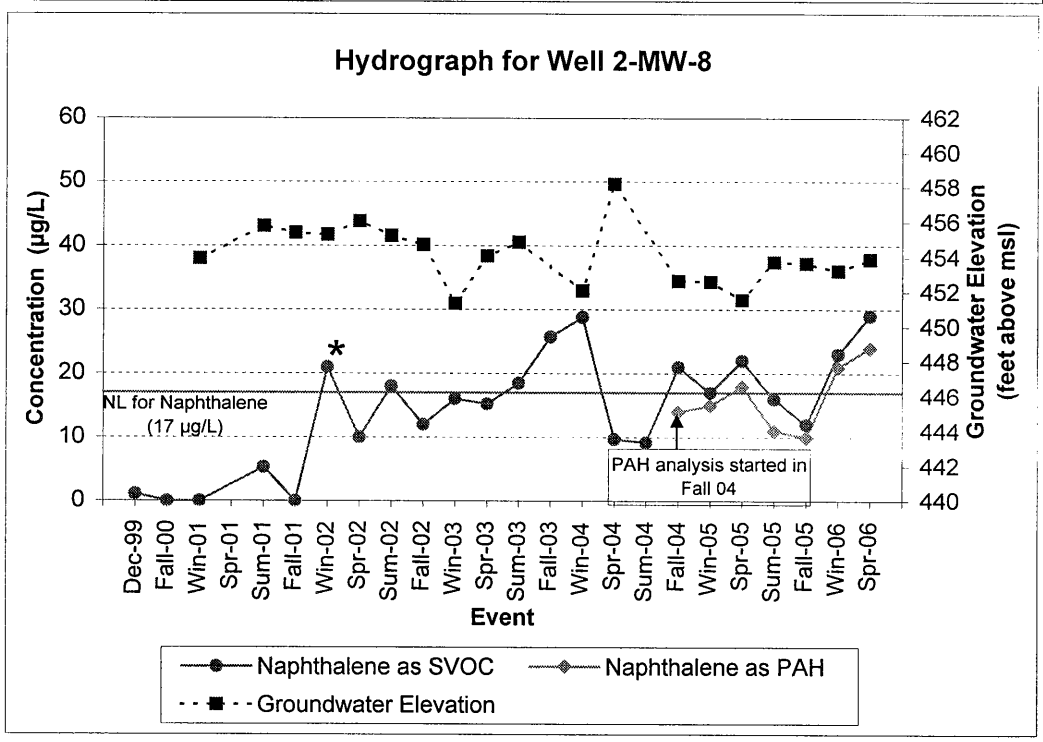
UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
WINTER 2004 THROUGH SPRING 2006

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99171-19	7/28/06	PRICHARD	TAB21	5739	3B





* - MicroPurge pump installed during winter 2002.

NL - California Department of Health Services (DHS) notification level (No MCL is available for naphthalene)

Figure 4. Groundwater Elevations and Concentrations of Benzene and Naphthalene at Site 2.

Table 1
Groundwater Elevations
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured Spring 2006	Groundwater Depth (feet below TOC) Spring 2006	Groundwater Elevation (feet above msl) Spring 2006	Winter 2006	Fall 2005	Summer 2005
2-MW-1	468.26	08-May-06	14.13	454.13	453.42	453.56	453.89
2-MW-2	468.34	08-May-06	16.30	452.04	451.49	NM	NM
2-MW-3	482.84	08-May-06	30.06	452.78	452.24	452.36	452.77
2-MW-5[a]	474.50	08-May-06	20.24	454.26	453.20	453.21	453.01
2-MW-6	475.38	08-May-06	21.82	453.56	452.95	NM	NM
2-MW-7[a]	475.39	08-May-06	21.10	454.29	452.96	453.93	453.84
2-MW-8[a]	476.51	08-May-06	22.61	453.90	453.22	453.66	453.73
2-MW-9[a]	476.24	08-May-06	21.84	454.40	453.29	453.44	452.91
2-MW-10	479.94	08-May-06	27.70	452.24	452.40	452.51	452.44
2-MW-11	482.10	08-May-06	30.48	451.62	451.12	451.15	451.56
2-MW-12	477.77	08-May-06	27.20	450.57	450.32	450.57	450.67
OS-MW-1	476.28	08-May-06	24.54	451.74	451.17	451.30	451.76
OS-MW-2	471.50	08-May-06	20.20	451.30	450.74	450.90	451.28

Definition(s):

msl - mean sea level
NM - not measured
TOC - top of well casing

Note(s):

a - Non-vented well; part of remote sampling system.

Table 2
Water Quality Parameters
Spring 2006
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sampling Location	**2-MW-8**	**2-MW-12**
Sample ID	**V2MW8M**	**V2MW12F**
Collection Date	**08-May-06**	**08-May-06**
Field Parameters[1]:		
Temperature (°Celsius)	19.11	19.39
Conductivity (µmhos/cm)	13,116	7,848
pH	4.93	6.74
Turbidity (NTUs)	3.45	14.8

Definition(s):

µmhos/cm - micromhos per centimeter
NTU - nephelometric turbidity unit

Note(s):

1 - Field parameters measured immediately prior to sampling.

Table 3
Metals in Groundwater
Spring 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					2-MW-12		
Sample ID					V2MW12F		
Collection Date					08-May-06		
Dissolved Metals	MDL[1]	PQL[1]	Primary MCL	BTV			
Aluminum	15	60	1,000	1,200	60	U	g
Antimony[2]	40	100	6	10	40	U	g
Arsenic	4	10	10	7	10.1		g
Barium	1	5	1,000	276	369		g
Beryllium[2]	1	5	4	0.3	1	U	g
Cadmium	1	5	5	5	2	U	g
Calcium	22	500	N/A	197,000	215,000		g
Chromium	1	10	50	20	5	U	g
Cobalt	2	15	N/A	13	14.5	J	q
Copper	1	10	1,300	58	5	U	g
Iron	4	100	N/A	3,530	1,020		g
Lead	2	3	15	3	2	U	g
Magnesium	26	200	N/A	119,000	191,000		g
Manganese	1	5	N/A	971	185		g
Molybdenum	2	15	N/A	12	16.6		g
Nickel	5	20	100	490	44.9		g
Potassium	41	1,000	N/A	13,300	12,800		g
Selenium[2]	5	10	50	3	5	U	g
Silver[2]	1	10	N/A	0.2	5	U	g
Sodium	23	500	N/A	420,000	1,550,000		g
Thallium[2]	5	10	2	1	9.55	J	q
Vanadium	1	10	N/A	28	5	U	g
Zinc	2	20	N/A	80	9.99	J	q

Table 3
Metals in Groundwater
Spring 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Data Validity Qualifier(s):

J - The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.
q - The analyte detection was below the PQL.

Definition(s):

BTV - background threshold value
MCL - maximum contaminant level
MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan

Note(s):

Bold type indicates results that were above the MCL.
Shading indicates results that were above the 95th percentile BTV.
1 - Values from QAPP Addendum (Tetra Tech 2004a).
2 - The BTV was less than the detection limit for this metal.

Table 4
VOCs in Groundwater
Spring 2006
EPA Method SW8260B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location				**2-MW-8**	
Sample ID				**V2MW8M**	
Collection Date				**08-May-06**	
	MDL[1]	**PQL[1]**	**Primary MCL**		
Benzene	0.07	0.4	1	**68**	g
Ethylbenzene	0.12	1.0	300	53	g
m,p-Xylenes	0.25	2.0	1,750[2]	270	g
o-Xylene	0.13	1.0	1,750[2]	71	g
Toluene	0.11	1.0	150	26	g
All other target analytes	N/A	N/A	N/A	ND	

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.

Definition(s):

MCL - maximum contaminant level
MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
ND - not detected; result is below MDL
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan

Note(s):

Bold type indicates results that were above the MCL.

1 - Values from QAPP Addendum (Tetra Tech 2004a).

2 - MCL of 1,750 µg/L applies to sum of *m*-xylene, *o*-xylene, and *p*-xylene.

Table 5
SVOCs and PAHs in Groundwater
Spring 2006
EPA Methods SW8270C and SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

				SVOCs			PAHs	
Sample Location	Sample ID	Collection Date		2-Methylnaphthalene	Naphthalene	All Other Target Analytes	Naphthalene	All Other Target Analytes
			MDL[1]	1.8	1.6	N/A	0.024	N/A
			PQL[1]	10	10	N/A	1.0	N/A
2-MW-8	V2MW8M	08-May-06		32 g	29 g	ND	24 g	ND

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.

Definition(s):

MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
ND - Not detected; result is less than the MCL.
PAH - polynuclear aromatic hydrocarbon
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
SIM - selected ion monitoring
SVOC - semivolatile organic compound

Note(s):

The California Department of Health Services notification level for naphthalene is 17 µg/L.
1 - Values from QAPP Addendum (Tetra Tech 2004a).

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Benzene (µg/L)[a]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	0.0465	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.0675	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	0.0445	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	0.69	NA	ND	NA
2-MW-8	0.375	**3.5**	**4.4**	NA	**5.1**	**5.3**	**36**	**7.7**	**23**	**18**	**26**	**32.5**
2-MW-9	0.0485	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	0.0472	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.23	NA	0.32	NA	0.45	NA	NA	NA	**1.5**	NA	**1.7**	NA
2-MW-8	**22.5**	**33**	**33.8**	**22**	**21**	**39**	**57**	**36**	**37**	**35**	**67**	**68**
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Toluene (µg/L)[a]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	0.64	ND	ND	ND	NA	2.2	NA	1.2	NA
2-MW-8	2.06	5.3	11	NA	11	6.4	64	12	35	23	37	22.7
2-MW-9	ND	ND	ND	0.59	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	0.53	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA
2-MW-5	0.44	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.17	NA	ND	NA	ND	NA	NA	NA	0.74	NA	0.8	NA
2-MW-8	12.1	24.1	9.98	6.7	5.5	8.9	11	8.7	7.7	7.5	21	26
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	0.4	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Ethylbenzene (µg/L)[a]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	2.4	NA	1.7	NA
2-MW-8	1.38	5.2	10	NA	8.7	4.9	62	12	37	31	36	34.7
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA
2-MW-5	ND	NA	0.20	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.1	NA	0.14	NA	0.29	NA	NA	NA	1.3	NA	2.2	NA
2-MW-8	32.3	26.9	34.1	20	19	34	39	26	22	30	56	53
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	m,p-Xylenes (µg/L)[b]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.316	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	4.6	ND	ND	ND	ND	ND	NA	22	NA	17	NA
2-MW-8	6.26	29	42	NA	37	37	250	61	160	72	180	230
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	7.88	NA	8.08	NA	11	NA	NA	NA	31	NA	30	NA
2-MW-8	125	227	218	110	90	190	240	160	53	160	290	270
2-MW-9	0.17	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	o-Xylene (µg/L)[b]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.114	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	4.9	NA	8.6	NA	6.4	NA
2-MW-8	2.21	6	14	NA	12	10	74	21	53	35	52	56.2
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	2.59	NA	2.97	NA	4.3	NA	NA	NA	11	NA	11	NA
2-MW-8	24.7	61.6	48.7	28	28	48	51	42	41	40	71	71
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	TPH as gasoline (mg/L)											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	0.11	ND	ND	ND	ND	0.27	NA	0.25	NA	0.15	NA
2-MW-8	0.0719	0.69	0.62	NA	0.88	0.64	4.9	1.2	2.8	2.3	3.6	2.72
2-MW-9	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.09	NA	0.09[c]	NA	0.1	NA	NA	NA	0.2	NA	0.29	NA
2-MW-8	2.12	2.27	2.55	1.5	1.2	2.3	NA	NA	1.4	NA	2.8	NA
2-MW-9	ND	NA	0.02[c]	NA	ND	NA	NA	NA	ND	NA	ND	NA
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	0.02[c]	NA	ND	NA	NA	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	0.03[c]	NA	ND	NA	ND	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Naphthalene (µg/L)											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	0.124	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	1.07	ND	ND	NA	5.3	ND	21	10	18	12	16	15.2
2-MW-9	0.205	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	0.137	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
2-MW-7	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-8	18.5	25.7	28.8	9.7	9.2	21	17	22	16	12	23	29
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Aluminum (µg/L)[d]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	238	380	293	ND	464	662	NA	288	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	118	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	ND	209	NA	ND	NA	ND	NA
2-MW-6	NA	399	ND	ND	ND	229	678	NA	374	NA	NA	NA
2-MW-7	NA	470	373	423	408	666	**1,180**	NA	200	NA	475	NA
2-MW-8	NA	**1,380**	**1,260**	NA	**1,650**	**1,970**	**13,500**	**12,700**	**12,300**	**3,970**	**7,410**	**8,600**
2-MW-9	NA	ND	ND	268	ND	483	548	NA	ND	NA	265	NA
2-MW-10	NA	ND	ND	ND	232	277	651	NA	341	NA	622	NA
2-MW-11	NA	NA	NA	ND	ND	ND	341	242	ND	ND	ND	33.2[c]
2-MW-12	NA	NA	NA	ND	ND	ND	284	186	ND	ND	ND	26.6[c]
OS-MW-1	NA	ND	ND	ND	ND	ND	313	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	211	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	383	NA	464	NA	408	NA	386	NA	445	NA	413	NA
2-MW-3	ND	NA	17.8	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-5	ND	NA	21.9	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	519	NA	224	NA	574	NA	662	NA	543	NA	652	NA
2-MW-8	**8,320**	**9,300**	**6,880**	**5,330**	**5,100**	**5,420**	**5,070**	**5,430**	**5,060**	**4,960**	**5,750**	NA
2-MW-9	284	NA	132	NA	ND	NA	104	NA	61.5	NA	ND	NA
2-MW-10	939	NA	505	NA	213	NA	521	NA	ND	NA	74.7	NA
2-MW-11	NA	26.2	23	NA	ND	ND	ND	ND	ND	ND	ND	NA
2-MW-12	NA	33.6	19	NA	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	42.8	NA	44.6	NA	ND	NA	ND	NA	ND	NA	ND	NA
OS-MW-2	20.1	NA	26.9	NA	ND	NA	ND	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Beryllium (µg/L)[e]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	NA	ND	ND	NA	ND	ND	**12.7**	**13.1**	**12.2**	**7.02**	**11.3**	**10.3**
2-MW-9	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	1.5	NA	ND	NA	2.43	NA	1.64	NA	1.71	NA	1.62	NA
2-MW-8	**10**	**10.9**	**9.8**	**8.42**	**8.25**	**7.79**	**7.47**	**7.82**	**6.81**	**7.14**	**7.68**	NA
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-10	2.7	NA	1.7	NA	ND	NA	1.5	NA	ND	NA	ND	NA
2-MW-11	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	NA
2-MW-12	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Cadmium (µg/L)[f]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	10.8	55.4	12.4	12.7	10.2	12.4	11.1	NA	10.7	NA	79.6	NA
2-MW-3	2.32	12	ND	4.13	6.6	2.05	5.84	7	5.98	NA	4.17	NA
2-MW-5	ND	4.9	298	141	59.3	137	4.74	NA	13.6	NA	6.68	NA
2-MW-6	4.31	ND	41	20.5	8.96	30.2	5.22	NA	4.66	NA	NA	NA
2-MW-7	2.79	4.4	6.39	6.62	6.78	29.7	17.5	NA	1.94	NA	8.63	NA
2-MW-8	22.4	6.74	35.2	NA	34	38.7	35	37	34.8	26.4	38.9	41.6
2-MW-9	42.3	34	74.5	76.5	81.1	96	72.1	NA	73.4	NA	12.4	NA
2-MW-10	60.2	80.4	78.8	76.3	77.4	88.1	71.8	NA	87.5	NA	11.3	NA
2-MW-11	NA	NA	NA	5.87	5.39	7.18	4.33	5.11	5.8	4.56	5.74	5
2-MW-12	NA	NA	NA	36.3	36.1	31.6	ND	12.7	17.4	ND	8.12	1.9
OS-MW-1	38.1	85.6	54.7	54.5	50.8	60.5	46.6	NA	58.8	NA	63.2	NA
OS-MW-2	NA	NA	NA	6.82	13.9	2.56	10.9	NA	10.3	NA	10.4	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06	Spr-06
2-MW-1	13.1	NA	14.1	NA	12	NA	11	NA	14	NA	11.8	NA
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-5	4.5	NA	3.4	NA	14.1	NA	4.96	NA	5.49	NA	3.74	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	7.6	NA	6.8	NA	10.3	NA	7.06	NA	7.63	NA	7.93	NA
2-MW-8	39.8	38.9	39.6	40.5	40.2	39.5	39.5	36.8	37.6	33.9	35	NA
2-MW-9	85.8	NA	83.5	NA	84.4	NA	87.2	NA	86.1	NA	84.8	NA
2-MW-10	59.7	NA	69.9	NA	64.5	NA	71.3	NA	ND	NA	28.8	NA
2-MW-11	NA	6.5	4.9	NA	4.59	7.1	8.21	3.2	7.74	3.69	5	NA
2-MW-12	NA	ND	ND	NA	ND	ND	ND	ND	2.07	ND	ND	ND
OS-MW-1	64.7	NA	73.8	NA	64.9	NA	72.3	NA	64	NA	52.3	NA
OS-MW-2	9.8	NA	5.2	NA	2.25	NA	2.52	NA	3.84	NA	3.39	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Selenium (µg/L)[g]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	NA	39.8	35.8	32.4	37.6	43.8	32	NA	23.9	NA	**127**	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	23.1	NA
2-MW-5	NA	ND	ND	14.9	7.08	10.7	ND	NA	ND	NA	47.6	NA
2-MW-6	NA	31.9	29.8	28.5	35.9	6.83	30.1	NA	ND	NA	NA	NA
2-MW-7	NA	35.1	28.8	34.2	31.2	46.1	31.3	NA	22.3	NA	**63.1**	NA
2-MW-8	NA	37.7	36.3	NA	37.5	43.2	ND	35.2	ND	21.3	**88.0**	26.7
2-MW-9	NA	43.4	37.5	40.3	42.0	47.8	31.1	NA	31.2	NA	**88.6**	NA
2-MW-10	NA	23.5	14.3	20.9	32.3	27.4	22.6	NA	9.67	NA	20.8	NA
2-MW-11	NA	NA	NA	25.3	24.1	25.2	25.8	**55**	23.7	**87.5**	**148**	36.3
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	40.7	**52.1**	ND
OS-MW-1	NA	14.8	9.11	16.3	15.8	13.6	ND	NA	ND	NA	**58.3**	NA
OS-MW-2	NA	NA	NA	10.7	13.6	ND	ND	NA	ND	NA	34.4	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06	Spr-06
2-MW-1	42.9	NA	35	NA	40.1	NA	39.4	NA	45.7	NA	41.7	NA
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
2-MW-5	**62.6**	NA	16.9	NA	17.6	NA	25	NA	24.8	NA	21.2	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	**57.5**	NA	27.2	NA	37.3	NA	37	NA	35.8	NA	33	NA
2-MW-8	43.1	30.7	26.2	35.9	32.2	39.4	41	39.4	40.7	36.6	38.1	NA
2-MW-9	**56.7**	NA	33.4	NA	44.7	NA	48.3	NA	48.3	NA	46.8	NA
2-MW-10	23.9	NA	21.1	NA	24.1	NA	28.8	NA	ND	NA	7.46	NA
2-MW-11	NA	36.3	38.6	NA	42.8	44.1	45.7	45.6	46	40.8	41.9	NA
2-MW-12	NA	3.3	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	18	NA	17.1	NA	15.2	NA	13.3	NA	13.5	NA	6.99	NA
OS-MW-2	12.3	NA	8.3	NA	15.9	NA	6.56	NA	7.79	NA	11.4	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Thallium (µg/L)[h]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	ND	ND	ND	ND	66.6	ND	NA	ND	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	44.9	ND	ND	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	90.0	ND	NA	ND	NA	ND	NA
2-MW-6	NA	ND	ND	ND	ND	35.9	ND	NA	ND	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	59.9	ND	NA	ND	NA	ND	NA
2-MW-8	NA	ND	ND	NA	ND	76.9	ND	ND	ND	14.8	ND	ND
2-MW-9	NA	ND	ND	ND	ND	78.4	ND	NA	ND	NA	ND	NA
2-MW-10	NA	ND	ND	ND	ND	71.1	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	66.1	ND	ND	ND	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	69.7	ND	ND	ND	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	65.2	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	38.5	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**	**Spr-06**
2-MW-1	ND	NA	1.30	NA	7.55	NA	7.62	NA	9.77	NA	ND	NA
2-MW-3	ND	NA	ND	NA	6.03	NA	ND	NA	ND	NA	ND	NA
2-MW-5	ND	NA	ND	NA	5.88	NA	ND	NA	7.01	NA	ND	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	ND	NA	9.7	NA	9.98	NA	5.48	NA	ND	NA
2-MW-8	ND	ND	ND	ND	10.1	8.01	ND	7.55	ND	6.27	ND	NA
2-MW-9	ND	NA	1.10	NA	10.6	NA	ND	NA	6.26	NA	ND	NA
2-MW-10	ND	NA	ND	NA	ND	NA	6.44	NA	7.44	NA	ND	NA
2-MW-11	NA	ND	1.40	NA	6.17	ND	8.56	11.1	6.03	6.69	ND	NA
2-MW-12	NA	ND	1.80	NA	ND	ND	ND	5.5	5.99	7.28	ND	9.55
OS-MW-1	ND	NA	0.85	NA	ND	NA	ND	NA	ND	NA	ND	NA
OS-MW-2	ND	NA	1.30	NA	ND	NA	ND	NA	ND	NA	ND	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Definition(s):

BTV - background threshold value
MCL - maximum contaminant level
µg/L - micrograms per liter
mg/L - milligrams per liter
NA - not analyzed
ND - Not detected; result is less than the method detection limit.
TPH - total petroleum hydrocarbons

Note(s):

Bold type indicates results that were above the MCL.
Shading indicates results that were above the 95th percentile BTV.

a - The MCLs for benzene, toluene, and ethylbenzene are 1, 150, and 300 µg/L, respectively.
b - The MCL of 1,750 µg/L applies to the sum of *m*-xylene, *o*-xylene, and *p*-xylene.
c - The data were qualified for blank contamination during the validation process. The laboratory method blank - showed the same order of magnitude as the sample results. The sample results are strongly suspected to be false positive.
d - The BTV and MCL for aluminum are 1,200 and 1,000 µg/L, respectively.
e - The BTV and MCL for beryllium are 0.3 and 4 µg/L, respectively.
f - The BTV and MCL for cadmium are both 5 µg/L.
g - The BTV and MCL for selenium are 3 and 50 µg/L, respectively.
h - The BTV and MCL for thallium are 1 and 2 µg/L, respectively.
i - Dedicated MicroPurge pumps were installed in Site 2 wells during winter 2002.
j - Thallium concentrations detected during fall 2001 are suspected to be due to laboratory contamination since they occur in all of the fall 2001 samples and do not fit with historic concentrations.

APPENDIX A PURGE RECORDS

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 05/08/06 SITE NUMBER 2

PROGRAM NAME BGMP TRIP BLANK I.D. V2TB1228

MONITORING WELL IDENTIFICATION V2-MW-8

SAMPLE I.D. V2MW8M DUPLICATE I.D. / COLLECTION TIME - / -

STATIC WATER LEVEL (ft btoc) 22.61 TOTAL WELL DEPTH (ft btoc) 34.8

WATER COLUMN (feet) 12.29 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 1.48 5 V (L) 7.40

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) - (vented to) -

PID READING IN BREATHING ZONE (ppm) (initial) - (vented to) -

SAMPLER'S SIGNATURE

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1040	Arrived at well											
1104	Begin Purge											0.18
1108		23.28	19.11	13200	4.84	47.2	1.65	265.0	cloudy	0.72	0.49	
1112		23.41	19.16	13079	4.96	8.73	0.78	250.1	clear	1.44	0.97	
1116		23.45	19.21	13101	5.00	4.82	0.50	238.8	clear	2.16	1.45	
1120		23.57	19.11	13116	4.93	3.45	0.40	236.1	clear	2.88	1.95	
1121	END PURGE											
1125	SAMPLE											
1140	Vacated well											

Fe+2 (ppm) - Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 23.71 FILTER LOT # -

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

Form number Tt-O-049 (9/05)

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TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 05/08/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V2TB1128~~ N/A SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-12 PID READING IN CASING (ppm) (initial) - (vented to) -

SAMPLE I.D. V12MW12F DUPLICATE I.D. / COLLECTION TIME - / - PID READING IN BREATHING ZONE (ppm) (initial) - (vented to) -

STATIC WATER LEVEL (ft btoc) 27.20 TOTAL WELL DEPTH (ft btoc) 67.9

WATER COLUMN (feet) 40.7 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.98 5 V (L) 4.90

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1150	Arrived at well											
1203	Begin Purge											0.28
1206		27.61	19.79	8996	7.31	16.2	0.69	-36.8	clear	0.84	0.85	
1209		27.81	19.47	8506	7.20	26.6	0.28	-101.2	clear	1.68	1.71	
1212		28.00	19.42	8101	7.00	25.0	0.18	-114.3	clear	2.52	2.57	
1215		28.14	19.38	7805	6.95	23.0	0.16	-106.5	clear	3.36	3.43	
1218		28.29	19.39	7766	6.72	17.3	0.14	-94.0	clear	~~4.20~~	~~3.82~~ 4.29	
1221		28.32	19.39	7848	6.74	14.8	0.14	-90.8	clear	5.04	5.14	
1222	END PURGE											
1225	SAMPLE											
1235	Vacated well											

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Fe+2 (ppm) _____ Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 28.35 FILTER LOT # 103170 10

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

APPENDIX B CHAIN-OF-CUSTODY RECORDS

06E071

CHAIN OF CUSTODY RECORD

[illegible] West 205th Street
Torrance, CA 90501
[illegible] (310) 681-3108

L4/VW01-16

SITE 2 DATE 05/08/06 PAGE 1 OF 1

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99171-06 ~~T99165-05~~
SAMPLERS (Signatures)
X
X

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 Diesel / Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 ~~7470 / 7471~~ Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample	OBSERVATIONS/COMMENTS:
1	~~V2TB1128~~ V2TB1228	05/08/06	0800	X													W	G	2		
2	V2MW 8M	↓	1125	X				X	X								↓	G	16		MS/MSD
3	V2MW 12F	↓	1225							X							↓	P	1	X	

JC JC

TURN-AROUND TIME: Standard

MATRIX TYPE: S = Soil, W = Water, SD = Sediment
CONTAINER TYPE: E = Encore, G = Glass, SS = Stainless Steel, P = Plastic
PRESERVATIVES: All samples are preserved at 4° C. T=3.2, T=2.8 °C
Water samples are preserved as indicated on the sample labels.
TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY: Joaquin E	SIGNATURE:	TETRA TECH, INC.	DATE: 5.10.06	TIME: 1120	TOTAL NUMBER OF CONTAINERS: 19
RECEIVED BY: A. GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 5/10/06	TIME: 11:20	METHOD OF SHIPMENT: courier
RELINQUISHED BY: A. GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 5/10/06	TIME: 13:49	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY:	SIGNATURE: JONLUNA	COMPANY: EMAX	DATE: 5/10/06	TIME: 1349	

TT001

Tt-IRP-009 (04/26/05)

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.